



ReadStar Series

Operator's Manual for:

**ReadStar II
ReadStar TT
CapStar II**

**Manual 968-01: Issue 6a
Crane Electronics Ltd**

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CE MARKING

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Declares that this product has been assessed and complies with the requirements of the relevant CE Directives.





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READSTAR SERIES OPERATOR'S MANUAL

INTRODUCTION



HOW TO USE THIS MANUAL

The following conventions are adopted throughout this manual:

Keys to be pressed will be shown as the key legend - for example **ESC**

Information displayed on the LCD screen will be shown in italics contained within quotation marks i.e. "TXD EDIT" or displayed as an actual screenshot.

Refer to the table of contents to find action to be performed.

Follow instructions for key presses required to carry out required action.

PACKING LIST

The following items are supplied with the ReadStar units.

READSTAR II

1 x ReadStar II Digital Torque Reader	1 x User Manual	1x Camera (Neck) Strap
2 x 'C' cell batteries		

READSTAR TT

1 x ReadStar TT Digital Torque Tester	1 x User Manual	2 x 'C' cell batteries
1 x Joint Kit		

CAPSTAR II

1 x CapStar II Bottle Top Tester	1 x User Manual	2 x 'C' cell batteries
1 x Bottle top/Adjustable component fixture		

CARE & STORAGE

This unit is designed for indoor use only

Operating temperature range	5-40 degrees C
-----------------------------	----------------

Storage temperature range	0-50 degrees C
---------------------------	----------------

The membrane keypad may be wiped clean with a soft damp cloth. The unit is not waterproofed and spillages should be avoided.

THIS UNIT CONTAINS NO USER SERVICEABLE PARTS. ONLY QUALIFIED SERVICE PERSONNEL SHOULD REPLACE OR FIT PARTS.

BATTERIES

2 type 'C' 1.5v Alkaline Manganese type battery cells, or rechargeable batteries.

NOTE: Batteries are not charged by the unit.

OVERVIEW

The ReadStar range enables the measurement and collection of torque data.

The ReadStar range comprises ReadStar II, ReadStar TT and CapStar II. These are basic, easy to use readouts which allow storage of up to 200 readings. Multilingual software and a consistent user interface throughout the range ensure ease of use.

The ReadStar II works with external torque transducers, whilst the ReadStar TT has a built-in torque transducer and CapStar II has a bottle top or adjustable component fixture.

All the ReadStar series have various modes and can measure track, peak, 1" peak (click) and pulse. Results are shown on an easy read display. Time and date stamped readings can be set to print automatically. The ReadStar range can be powered using "C" cells, rechargeable batteries or from the mains. All 3 products can either be fixed permanently or used as a portable device.



ReadStar II



ReadStar TT



CapStar II

READSTAR SERIES OPERATOR'S MANUAL

INTRODUCTION



FEATURES AND DIMENSIONS

POWER Two type 'C' cells
Rechargeable batteries
Mains powered (needs optional power supply)

WEIGHT

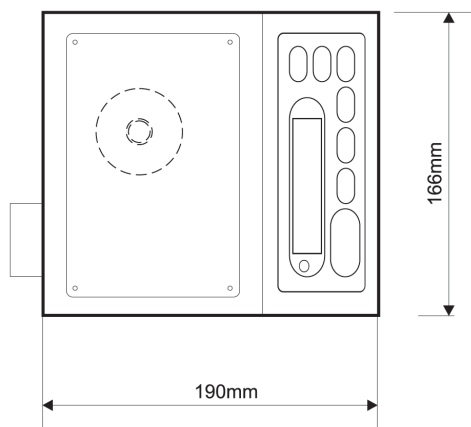
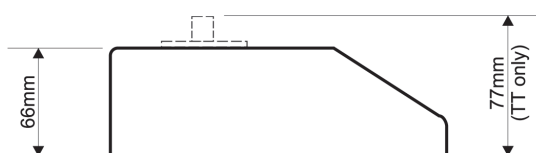
ReadStar II	0.9Kg
ReadStar TT	2.3Kg
CapStar II	3 Kg

CONSTRUCTION ABS cover; Steel base

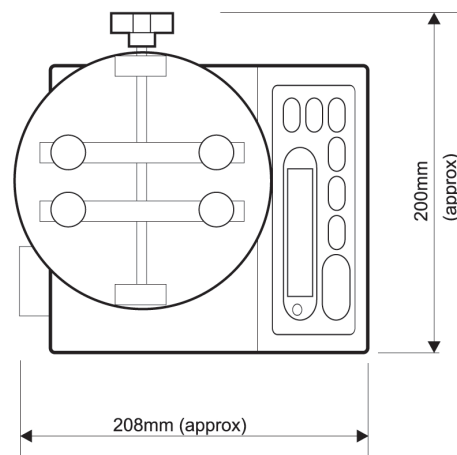
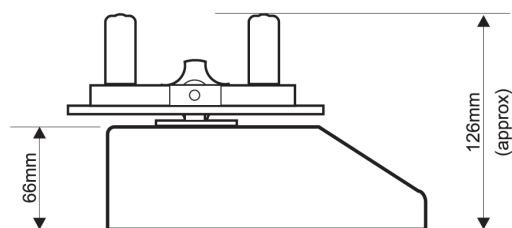
OUTPUT Serial dump - no handshaking (USB)

DIMENSIONS

ReadStar II	166mm (W) x 190mm (D) x 66mm (H)
ReadStar TT	166mm (W) x 190mm (D) x 75mm (H)
CapStar II	200mm (W) x 208mm (D) x 126mm (H) APPROX.



READSTAR



CAPSTAR



SPECIFICATIONS

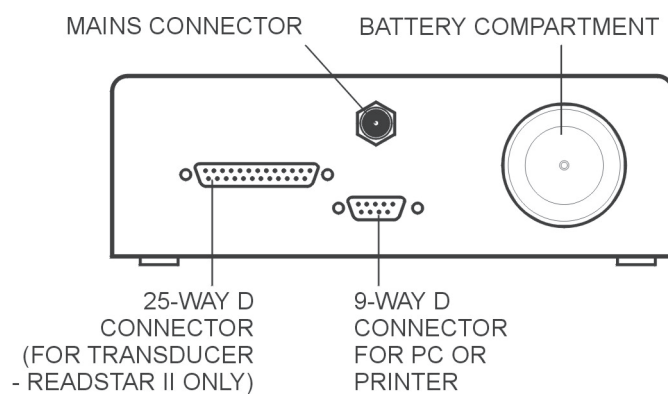
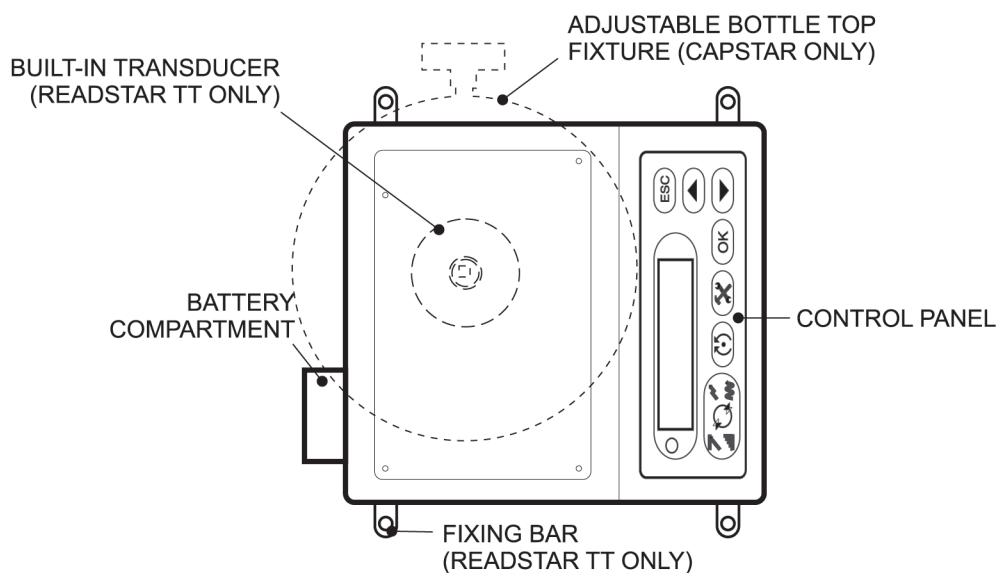
Accuracy:	$\pm 0.5\%$ of rated maximum transducer capacity.
Overload Capacity:	125% of stated maximum transducer capacity.
Zero Drift:	$<0.1\%$ of rated maximum transducer capacity.
Operating Temperature Range:	+5 to +40 degrees Celsius
Temperature Stability:	$\pm 0.1\%$ per degree Celsius.
Sealing:	IP40.
Humidity:	5% to 75% non condensing.
Serial Interface:	9 way female 'D' connector.
Frequency Response:	User selectable in 6 steps from 68Hz to 4385Hz
Calibration:	Issued with calibration certificate traceable to national and international standards. 12 months typical recalibration interval.
Warranty:	12 months parts and labour.
Servicing:	Crane Electronics Ltd offer a full repair facility and calibration to UKAS and international standards.

MAINS ADAPTOR POWER REQUIREMENTS

Input:	230V AC 50 Hz 70mA (UK and Euro models)
Input:	115V AC 60 Hz 120mA (US models)
Output:	9V DC 300mA (all models)



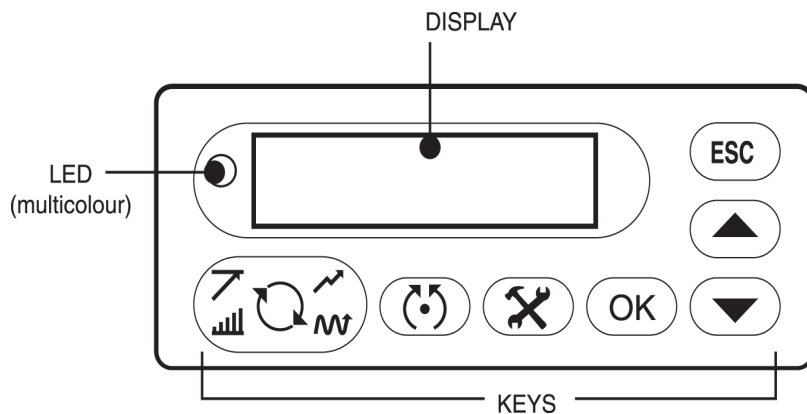
CONTROLS AND CONNECTIONS



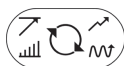
REAR VIEW



CONTROL PANEL



KEYS:



Mode key - used to select different measure modes.



Used to select direction of rotation (Left, Right or Both)



Tools key - used to access the Setup, Print, Options and Diagnostic menus



Enter key used to accept options



Keys used to move around the menu system and alter numeric values



Escape key (from the current function) - back 1 level in menu

SYMBOLS

These are the symbols used in the display panel of the ReadStar/CapStar:

DIRECTION OF ROTATION



LEFT



RIGHT



LEFT &
RIGHT



TRACK



PEAK



CLICK



IMPULSE



BATTERY LOW
INDICATOR

Other symbols in the display are in the form of text:

Torque; Nm; etc.



BATTERY LOW INDICATOR

When the batteries are getting low on charge, the battery indicator symbol will show in the bottom right hand corner of the screen. This indicates to the user the batteries are in need of replacement or recharging if rechargeable batteries are being used. If the batteries are low at switch on, the display will also show "BATT LOW" in addition to the warning symbol.

When the battery symbol starts to flash, the batteries are almost completely exhausted and auto shut down is imminent.

CHANGING THE BATTERIES

Removal

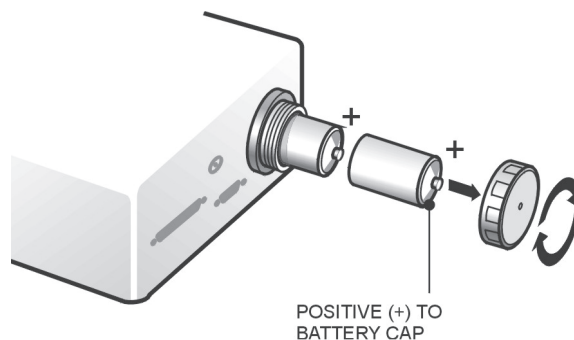
Unscrew the battery compartment cover at the rear of the ReadStar/CapStar and remove the 2 batteries.

Replacement

Place the 2 new batteries in the compartment as shown and screw the cover back into position. **Note the polarity of the batteries - the positive (+) ends should face towards the cover.**

Rechargeable batteries are fitted in the same way and can be recharged in situ using the optional charger/mains adaptor.

NOTE: If the ReadStar/CapStar does not switch on and the LED is showing a constant amber light, the ReadStar/CapStar will have to be reset. Press the **ESC** and keys **▲** simultaneously and hold for a few seconds to perform a hardware reset.



BATTERY DISPOSAL

To be disposed of in an environmentally sound manner and in accordance with local legislation.

Do not incinerate.

Do not disassemble.

Do not short the terminals or expose to high temperatures.

Where the customer has issues disposing of the originally supplied batteries - please return to Crane Electronics.

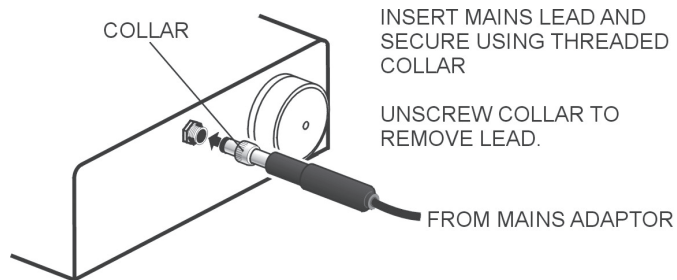
It is an offence to throw portable batteries out with domestic refuse.





MAINS OPERATION

To operate the ReadStar/CapStar directly from the mains, connect the optional adaptor/charger to the mains socket on the rear. Connect the adaptor to the mains supply and the ReadStar/CapStar is ready to use. When the mains supply is switched on, the ReadStar/CapStar will perform a hardware reset - see following page.



Note the polarity of mains adaptor:

The centre of the plug is positive.





POWERING ON / OFF

To switch on the ReadStar/CapStar, press any key.

Note: before taking any readings with the ReadStar/CapStar, always press **ESC** to automatically reset the display to zero.

To switch off, press Tools Key and choose 'SETUP' from the Menu. Press **OK** to access the Setup Menu. Press the **▲** key until 'OFF ?' is displayed. Press **OK**. Screen will prompt 'CONFIRM ?' Press **OK**. Unit will now power down.

HARDWARE RESET

To perform a hardware reset, press the **ESC** and **▲** keys together.

The ReadStar/CapStar will start its hardware reset and the display will light up all the segments of the LCD screen followed by the following screen messages:

"WARM RST" - "READSTAR II" - The version number - the selected language.

("READSTAR TT" in the case of the ReadStar TT and CapStar)

Note: Performing a Hardware Reset resets the ReadStar/CapStar but does not erase any settings or batch information. Use it to reset the software after changing the batteries.

AUTO POWER OFF FUNCTION

To conserve battery life in use, the ReadStar/CapStar will switch off automatically after a predefined period (1-10 mins).

As an energy saving feature, the ReadStar/CapStar is programmed to power down automatically if it has received no user input for a predefined period (1-10 mins). Pressing any key will restore the unit to the last display prior to powering off. This is to avoid the possibility of loss of data due to an interruption to the operator's activities while configuring the ReadStar/CapStar.

In view of this, it is advisable to ensure the ReadStar/CapStar is in either in the Main Configure Menu or in Measure mode at the time of an intentional shut down.

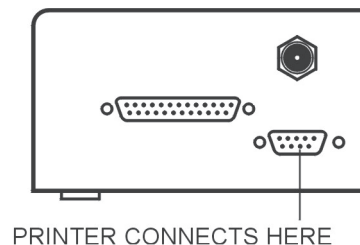
ATTACHING A PC OR PRINTER

A printer or PC may be connected to the ReadStar/CapStar using optional printer cable no. 701-1500, or optional PC cable 757-1500. Attach one end of the cable to the ReadStar/CapStar 9 way connector as shown. The other end of the cable connects to the serial port on a dot matrix printer such as the Epson LX-300 or to the serial port of a PC. The printer should be configured to the following settings:

- Baud rate = 9600
- 8 data bits
- Stop bit 1
- No parity
- No flow control

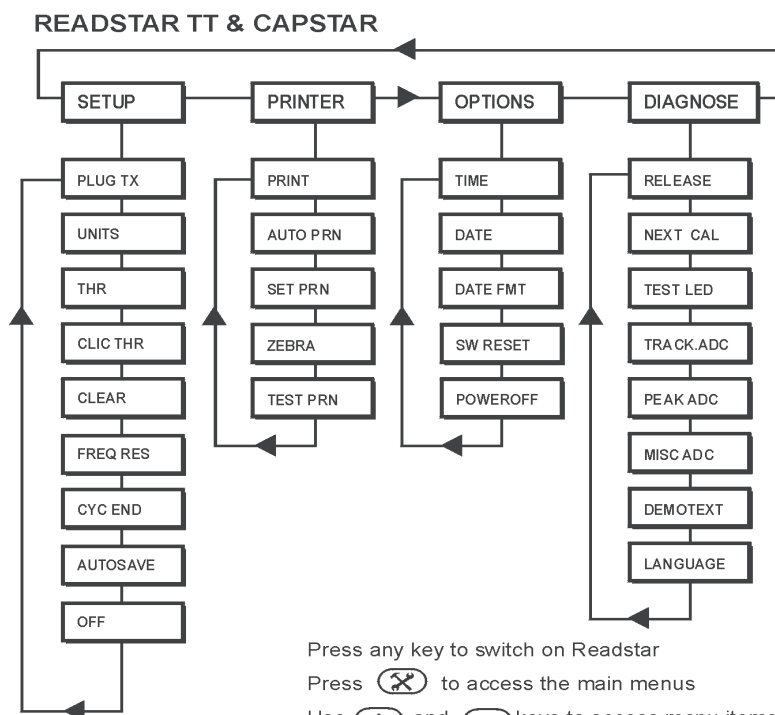
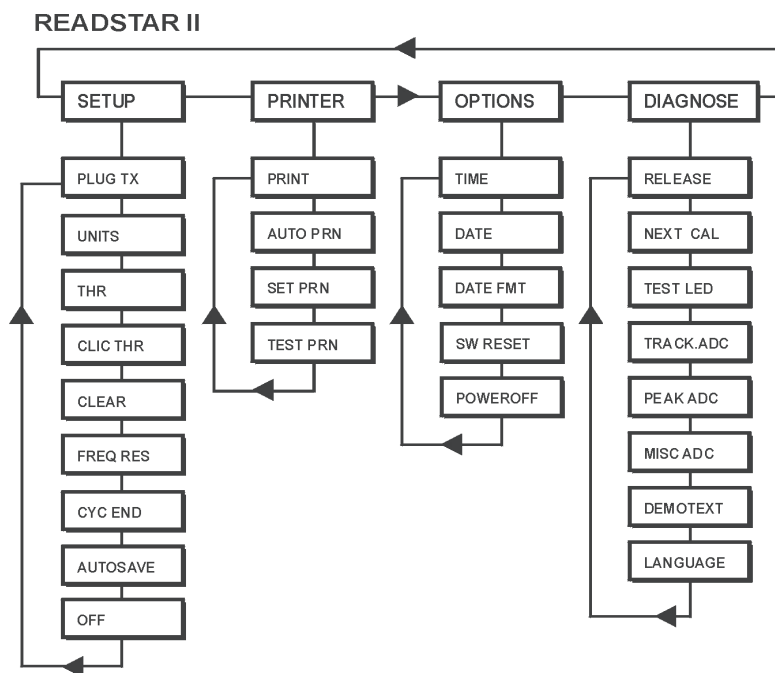
These are usually factory set as the default settings for the printer.

Note: If the printer has an X ON/X OFF feature, this will need to be set to ON (usually set via a DIP switch on the printer). For further information, please refer to the manual which came with your printer.





MENU STRUCTURE



Press any key to switch on Readstar

Press to access the main menus

Use and keys to access menu items

Press to enter the chosen sub-menu

Use and keys to access menu items

Press to edit or view the selection

Press to return to previous level



BASIC OPERATING PRINCIPLES

The operation of the ReadStar range is basically the same for all 3 units. The only difference is that ReadStar II requires an external transducer to be attached in order to apply torque, while the ReadStar TT has a built-in transducer. CapStar II has an adjustable bottle top/component fixture.

The method of operation for both units is based around a simple menu structure for ease of use. At switch on, the units are in Measure mode, ready to accept torque input.

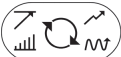
MEASURE MODE

This is the mode in which the operator applies tightening force to a joint and measures the torque.

Parameters that can be set directly from the Measure Mode are:

Type of Measurement - Peak, Click Dip, Impulse or Track

Direction of Rotation

Press the  key repeatedly to toggle between the following options:





Peak Mode

Click Dip Mode

Impulse Mode

Track Mode

Use the  Key to toggle between the directions of rotation available (Left, Right or Both)

The following menus are available to change various parameters etc. by pressing the  key on the ReadStar/CapStar and using the  and  arrow keys to scroll to the required menu and press .

SET UP MENU (see page 21)

This menu allows the setup of various parameters to be set or viewed. These are; UNITS (Units of Measurement), THR (Threshold Setting - view only), POWEROFF (see page 10), AUTOSAVE (Readings automatically added to batch file) and CLEAR (Clear the stored readings).

PRINTER MENU (See page 22)

This menu controls the printer functions - available if a suitable printer is connected using the optional printer cable. See page 12. The options include printing the stored data, testing the printer, automatic printing on or off, and setting the printer configuration.



OPTIONS MENU (See page 23)

The options menu allows the user to set the Time and Date of the unit plus the Date Format. It also allows the user to change the Power Off settings and to perform a software reset.

DIAGNOSTICS MENU (see page 24)

This menu allows various diagnostics data to be viewed. This includes the product software release version, the working span of the ReadStar/CapStar, the date the next calibration is due, testing the operation of the LEDs, track A-D converter values, miscellaneous A-D converter values, and a demonstration text message.

USING THE MENU SYSTEM

Viewing or changing any of the parameters within the menu structure is basically the same.

First, select the tools menu by pressing .

Next use the and arrow keys to scroll to the sub menu containing the menu item to be viewed or amended.

Press to select the item.

The current item setting will be displayed. If it can be amended by the user, use the and arrow keys to scroll through the available options and press to select.

If the item requires a numerical input (ie Threshold or Time), the figure will be displayed and the first field to be edited will be flashing. Use the and arrow keys to increment or decrement the number and press to select. The next field will now be flashing. Repeat the process until all the fields have been amended.

In all of these operations, the following rules apply -

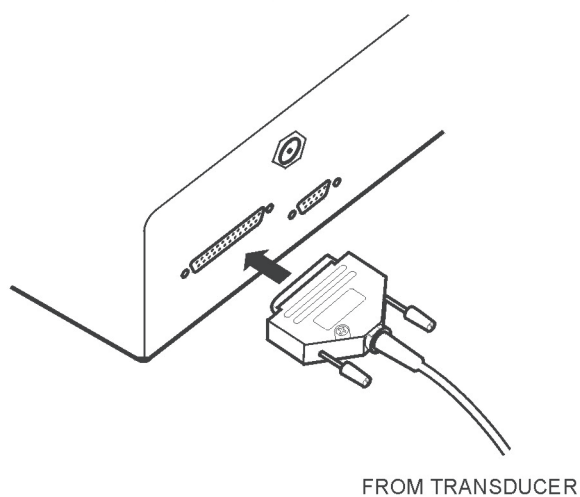
and arrow keys to scroll or to increment/decrement numeric values

to select

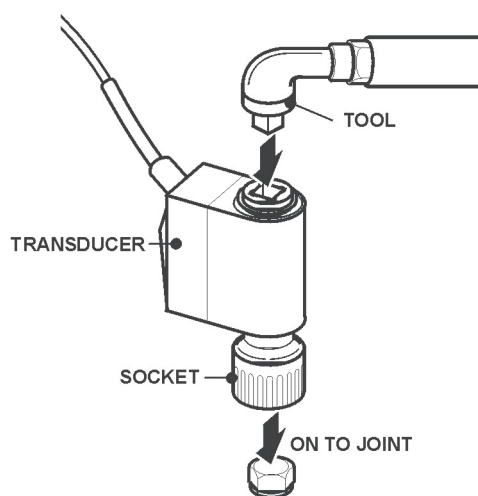
to escape (back up the menu system 1 level)

CONNECTING A TRANSDUCER - READSTAR II

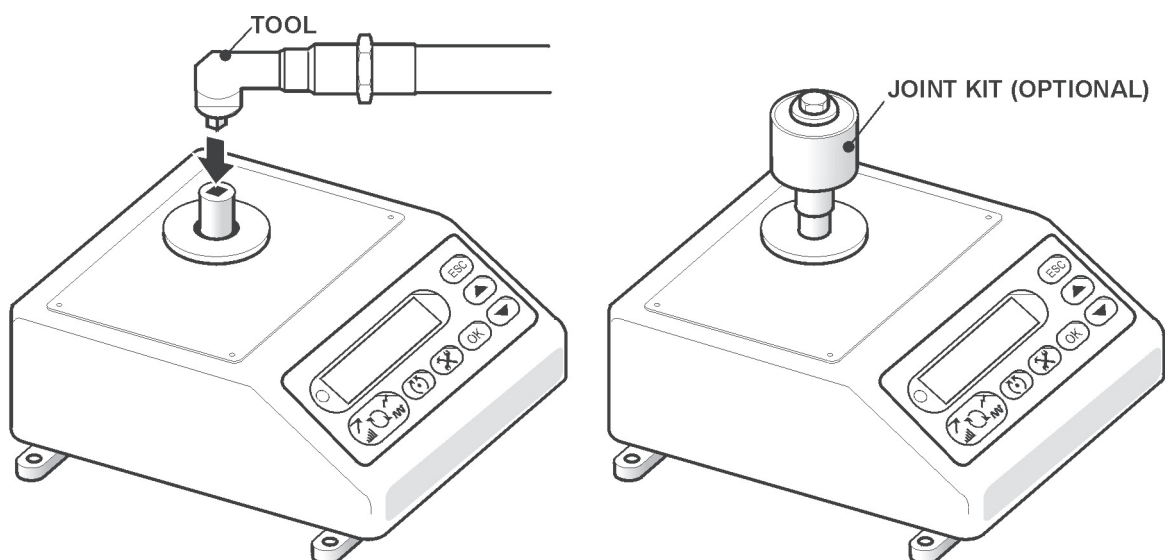
CONNECT TRANSDUCER TO READSTAR



CONNECT THE TOOL TO THE TRANSDUCER AND THE TRANSDUCER TO THE JOINT.



BUILT-IN TRANSDUCER - READSTAR TT

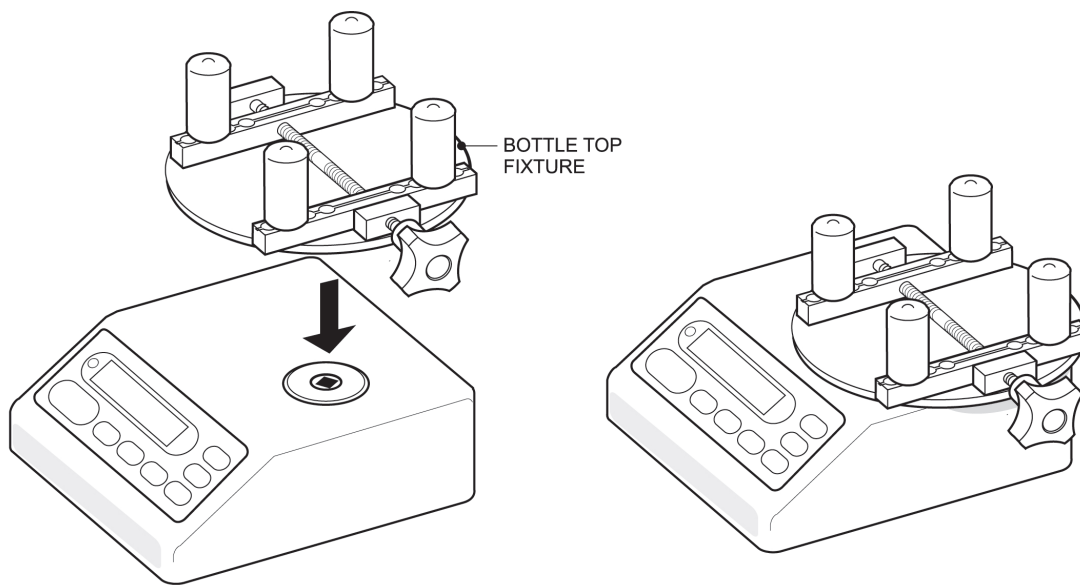


ReadStar TT shown with optional joint kit fitted



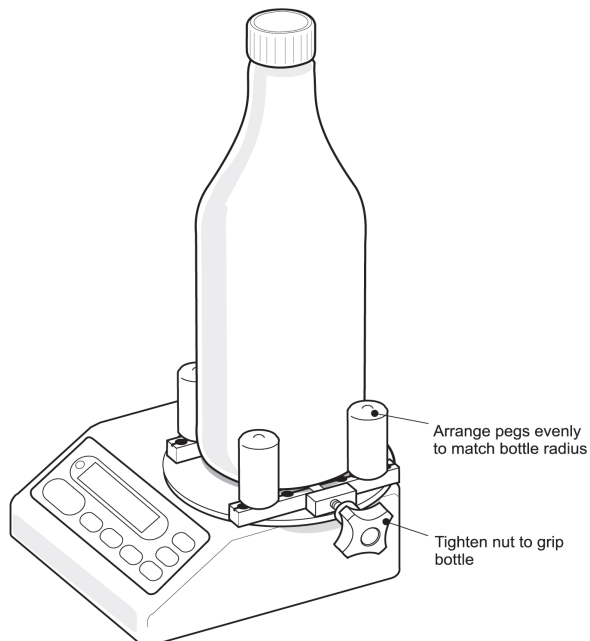
FITTING THE ADJUSTABLE BOTTLE TOP FIXTURE (CAPSTAR)

Ensure bottle top fixture is located fully into Square Drive on the Transducer Module.



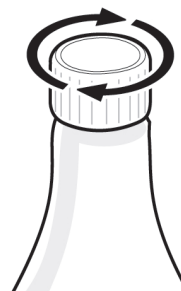
LOADING A BOTTLE

Position the white pegs on the top, so that they grip the bottle evenly when the black adjustment knob is tightened to hold the bottle. (Try to get the bottle as near to the centre of the round turntable as possible). It is possible to clamp a bottle or container from 10mm to 130mm in diameter. Ensure that the white pegs are properly seated in the slots so that they cannot rotate when the bottle closure is turned.



Measuring the Torque

Select the desired operating mode from Section 1. Tighten or release the closure as required to obtain readings.





MEASURE MODE (HOW TO TAKE A TORQUE READING)

Switch on the ReadStar/CapStar - press any key.

Press **ESC** to reset the display to zero.

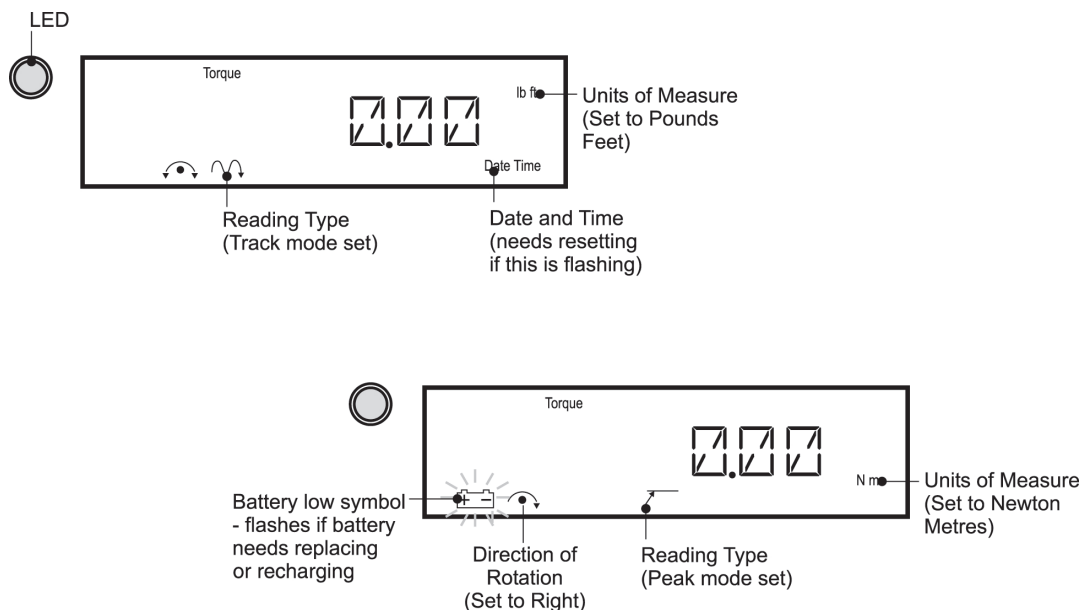
For the ReadStar TT, torque should be applied via a suitable tool to the built-in transducer - see page 16.

For the ReadStar II, the unit must be connected to a suitable transducer before the torque can be applied. See page 16.

For the CapStar II, the bottle top fixture must be fitted - see page 17.

The display shows the readout, the type of measurement (Peak or Track) and the direction of rotation (if in peak mode). If Track mode is selected, the symbol shows rotation in both directions.

The diagram below shows 2 typical examples of the measure mode screen.



To change the Measure Mode - press **↺↻** (see page 19)

To change the direction of rotation - press **↻** (see page 19)

To change the Units of Measure - go to **SETUP** menu (see page 21)

To print data - go to **PRINTER** menu (see page 22)

To view stored readings - press **▲** (see page 20)

To change language - go to **DIAGNOSTICS** menu (see page 24)

To set time and date - go to **OPTIONS** menu (see page 23)



PEAK MODE SELECTED

If Peak Mode selected, applying torque in the direction selected will cause the peak reading to be displayed on the screen.

TRACK MODE SELECTED

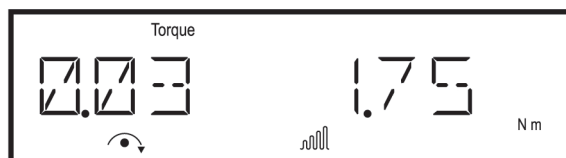
If Track mode is selected, applying torque in either direction will cause the amount of torque being applied to be continuously displayed.

CLICK DIP MODE SELECTED

If Click Dip mode is selected, applying torque with a click wrench will cause the click dip reading to be displayed on the screen.

IMPULSE MODE SELECTED

If Impulse Mode is selected, applying torque with an impulse tool will cause the display to show the number of pulses (on the left of the screen) and the applied torque (on the right of the screen - see below).



LEFT AND RIGHT DIRECTION SELECTED (see following page)

Before a reading can be taken, the LED flashes Green. The **OK** button must be pressed.


The reading may be taken in the Left or Right direction.

The LED will flash Green again. The device waits for the **OK** key to be pressed before it will accept the next reading. If the **ESC** key is pressed - the LED changes from flashing Green to flashing Red. This denotes a stripped thread which is marked on the printout with the letter S.

NOTE: on all readings, a minus sign in front of the figure, indicates torque is being applied in the LEFT (anticlockwise) direction.



CHANGING THE DIRECTION OF ROTATION.

To alter the direction of rotation, press the  key.

With each key press, the display will cycle between the following options.

Right hand rotation.

Left hand rotation.

Left and Right rotation.



CHANGING THE UNITS OF MEASUREMENT

To change the **UNITS of measurement** (N M, LB FT etc.) you need to access the SETUP Menu (see page 21)

ADDING TO THE READINGS LIST MANUALLY


While in Measure Mode, readings taken can be added to the Readings list. If the Auto Save option has been set in the SETUP Menu (See page 21), all readings are automatically added to the end of the Readings list.

If this Auto Save has not been set, readings can be added manually from the MEASURE mode.

When the reading is taken, the ? symbol will flash when the reading is displayed. If  is pressed, the reading is added to the end of the Readings list. Pressing  will cause the ReadStar to ignore this reading.


VIEWING THE LAST READING NUMBER

While in Measure Mode, it is possible to view the number of the last reading stored in the Reading list. This will tell the operator how many readings are currently stored.

Press  and the screen will display the latest Reading number.



Press  to view the latest reading then use  and  to scroll through the list of stored readings.

(If no readings have been taken or the readings have been cleared, the display will show 'NO RDINGS')


Press the  key to reveal the readings stored in the batch.

The first figure is the latest reading number.

This will be followed by a plus, minus or equals sign to denote the status of the reading.

Pressing the  or  keys will allow the user to scroll through the stored batch readings.

Each reading shows the batch number, a sign as above to denote the status and the torque reading.


Press  (escape) twice to return to the Measure Mode.

The ReadStar can store up to 200 separate readings in the batch. When the batch is full, any



subsequent readings will wrap around and will begin overwriting the existing readings, starting with reading 1. To clear the batch, use the CLEAR function in the SETUP Menu - see page 21.

DELETING THE LAST READING NUMBER

Pressing  when in Measure Mode will delete the latest reading to be stored in the Reading list. The LED will glow RED to indicate deletion has taken place. 'CLEAR' will be shown on the screen for one second.

NOTE: Only 1 reading may be deleted until another reading has been taken.

SETUP MENU

The following options are available in the SETUP Menu:

PLUG TX (ReadStar II only)

Identifies the transducer attached to the ReadStar II

UNITS

The currently selected Units Of Measurement will be displayed (e.g. NM).

Units available (depending on the span of the ReadStar) are:

N M, KGFCM, KGFM, OZ IN, LB IN, or LB FT,

THR

Threshold - torque level at which to start measurement

CLIC THR

Click threshold - the amount of drop in torque seen when a mechanical wrench clicks. Value set is dependent on the type of wrench used - usually set to quite a low value.

AUTOSAVE

ON = automatically stores after taking reading

OFF = User must press  to store or  to disregard reading

If the auto save function is set to OFF, readings can be added manually to the batch list. See MEASURE mode, page 18.

CLEAR

Deletes all stored readings

FREQ RES

Displays the frequency response

CYC END

Displays the cycle end time



PRINTER MENU

Make sure the ReadStar is connected to a suitable printer - see page 12.

The following options are available in the PRINTER Menu:

PRINT

Printer will print header and all stored readings

AUTO PRN

Set to **ON** - Automatically sends date, time, reading and units to printer port.

Set to **OFF** - No readings are sent to printer port.

SET PRN

Set the **baud rate, number of data bits, parity, number of stop bits.**

ZEBRA

Set number of reading before printout (Zebra printer only).

TEST PRN

Sends a constant data stream to test the printer output.

Display will now show "PRINTING" and the printer will begin continuously printing a string of test characters.

NOTE: When printing, press **ESC** to stop the print. Display will show "ABORTED" and printing will stop.

A typical printout is illustrated below:

Page 1 of 2

```
ReadStar      73-2.00                CRANE ELECTRONICS
Span:         75.0 N                 Date:    04/01/2004
Serial No:22222                      Time:   12:13:22
Next Calibration due: 05/23/2005

Total Samples: 13
Mode:         Peak

Cycle End Time:75.00 N m
Direction:    7.50 N m
```

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OPERATING INSTRUCTIONS

Threshold Torque: 3.75 N m

Page 2 of 2

ReadStar 73-2.00

CRANE ELECTRONICS

Serial No: 22222

Date: 04/01/2004

Span: 75.0 N m

Time: 12:13:24

Next Calibration due: 05/23/2005

Samples		Date	Time	Torque
01	-	04/01/2004	12:53	5.38 N m
02	-	04/01/2004	12:53	8.60 N m
03	-	04/01/2004	12:53	6.01 N m
04	-	04/01/2004	12:53	6.07 N m
05	-	04/01/2004	12:53	5.70 N m

OPTIONS MENU

The following options are available in the OPTIONS Menu:

TIME

Set the time of the ReadStar/CapStar (the time setting is lost if batteries removed)

DATE

Set the date of the ReadStar/CapStar (the date setting is lost if batteries removed)

DATE FMT

Set the date format of the ReadStar/CapStar (DD-MM-YY or MM-DD-YY)

SW RESET

To perform a Software Reset:

Select "SW RESET"

To reset the software press **OK** "CONFIRM?" is shown - press **OK**. The unit will reset.

The default settings after a software reset are PEAK measure, RIGHT direction and N M units.

POWEROFF

Set the Power Off Delay

Display will show the currently set power off delay in minutes.

Select the time required (1 to 10 minutes, Never).



DIAGNOSTIC MENU

This menu allows various diagnostics data to be viewed.

Menu options are:

RELEASE

View the Software Release Number:

NEXT CAL

View the next calibration due date

TEST LED

Test operation of LEDs:

The LED will cycle 3 times through its colours (RED, GREEN and AMBER) with a text confirmation. The unit automatically returns to the **DIAGNOSTIC MENU**.

TRACKADC

View the ADC value for track mode

The 4 digits indicate an averaged value of the Analogue to Digital converter output.

Application of right hand torque will cause the value to increase.

Application of left hand torque will cause the value to decrease.

NOTE: With no torque applied the values displayed will be 2048 ± 50

PEAK ADC

View ADC value for peak mode.

MISC ADC

The display will scroll through the remaining internal A/D converter numbers and display their current output value. The normal values for these outputs are given below.

A/D No	Value
7	128 (± 6)
8	128 (± 6)
9	255 (± 5)
10	255 (± 5)
11	42-90

DEMOTEXT

Displays LCD test routine - a scrolling message appears

SPAN - ReadStar TT and CapStar only

Displays the torque span of the built-in transducer

LANGUAGE

User can change the language of the ReadStar (English, Spanish, German, Swedish, French, Italian, Czech, Portugese)



TROUBLESHOOTING GUIDE

The following guide gives some of the possible problems which could be encountered with the ReadStar/ CapStar, the possible causes, and the suggested remedial action.

Fault

LCD panel does not come on at power up.

Possible Cause

- A** Batteries not fitted correctly or not secured.
- B** Insufficient charge if using Ni-cad rechargeable batteries.
- C** Mains adaptor not connected correctly.

Action

- A** *Ensure the batteries are seated properly and the polarity is correct. Ensure the battery compartment cover is screwed down correctly. See page 10.*
- B** *Recharge. See page 10*
- C** *Check connection of the mains adaptor to the ReadStar/CapStar and check the power supply is connected to the mains and switched on. If necessary, try the ReadStar/CapStar with batteries to check if mains adaptor has a fault. Try the mains adaptor with all batteries removed from the device.*



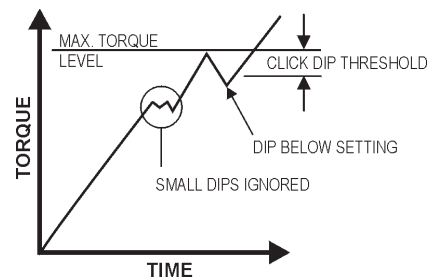
GLOSSARY OF TERMS

Angle Wrenches (also known as nutrunners)

Continuously driven tools which rely on torque reaction to cut off the air supply.

Click or Click Dip

A type of measurement used for Click Wrenches. The click level threshold is a preset figure representing the amount of dip below the maximum torque level to which the torque must fall to be accepted as a valid reading. (see also Click Dip Threshold)



Click Dip Threshold

The Click Dip Threshold is user defined to between 5 and 15% of the rated transducer span. (see also Click Dip)

Click Wrench

Type of manual torque wrench which 'clicks' when the preset torque value is reached. This causes a dip in the measured torque reading - hence the term 'click dip'.

Frequency Response

This is the setting used for a low pass filter for torque signals. The frequency response is the frequency in hertz (cycles per second), up to which the signal is not attenuated. It is more correctly described as the low pass bandwidth. At frequencies above that level, the signal will be attenuated or totally suppressed

High Output Transducer (H/O)

Torque transducer with no coding links but internal pre-amplifier giving an output signal level of typically 1 or 2 volts.

Impulse or Pulse

A type of measurement used for pulse tools.

Industry Standard Transducer (I/S)

Type of transducer, with no pre-amplifier or coding links, but with the exact rated torque, marked on the body.

Nutrunners

See Angle Wrenches

Peak

A type of measurement which records the highest torque applied to a transducer during an operation. This is used for angle wrench/nutrunner type torque tools.

Pulse Tools (also known as intermittent or impulse tools)

Torque tools which run continuously until resistance from the fastener is met, after which they apply torque in increasing pulses until the limit of the tool is reached. The reading is held in the display until the next reading is taken.



Sample

Individual torque reading.

Span

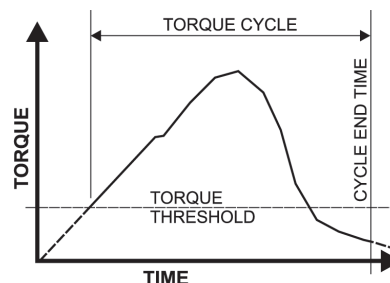
The Span is the effective operating range of a transducer. This is the range between zero and the maximum design limit of the transducer.

Threshold Torque Value

The level of torque which a signal must rise above and then fall below to be considered a valid torque cycle. In the ReadStar/CapStar, this is set at 5% of the rated span of the transducer.

Torque Cycle

A complete application of torque to a joint starting from the torque rising above the preset threshold value and finishing at the preset cycle end time.



Track

A type of measurement which follows the changing torque values imposed on a transducer as torque is applied. The display will return to zero after the torque is removed.

Units of Measure

This refers to the standard torque measurement units used to indicate the amount of torque applied.

The ReadStar series can convert and display torque in the following units:

Nm (Newton-Metres), **KG CM** (Kilograms-Centimetres), **KG M** (Kilograms-Metres),

OZ IN (Ounces-Inches), **LB IN** (Pounds-Inches) or **LB FT** (Pounds-Feet).

UTA Tx

A family of torque transducers which ReadStar II can identify by a serial EPROM.

UTA Tx ID

Specification of transducer by rating in pre-selected units. Used as an identity or 'name'.